Address by

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Good morning. It is a pleasure for me to be able to participate in this First Annual Logistics Management Symposium, and I am very flattered to have been asked to be the keynote speaker.

Of course, it is always gratifying to meet with such a distinguished group as we have both in the audience and on the platform. I am also pleased to see attention being given by the top management level of industry and government to the betterment of logistics management, which is one of our most perplexing problems.

Whether you represent industrial contractors, the DOD or NASA, all of you appreciate the importance of management in furthering the programs established to achieve our national objectives. As your keynote speaker for this symposium, I am here to stress one point -- NASA needs top management attention for its logistics requirements, now as never before.

With the Gemini program, as with Project Mercury, NASA's direct involvement in logistics was confined principally to the spacecraft. That is, the Air Force provided us with the launch vehicle and gave us superb launch operations support. The entire Department of Defense saw to it that recovery could be carried out on a global scale. Now NASA is entering the operational phase of the Apollo program, and unlike Mercury and Gemini, NASA is responsible for the launch vehicle and launch operations as well as the spacecraft. For the first time in a NASA manned space flight program, the greater part of logistics is not being provided by the Department of Defense.

This is why you and I are here today -- to put into action the maxim that effective logistics management is indispensable to program success.

Manned space flight logistics management, as in the military, is evident in the spares requirements effort for any system, as reflected by the maintenance analysis. It is evident in the maintenance of systems, including the training of field maintenance people who follow the hardware. It is evident in both space and military hardware in the maintainability concept, which must be incorporated into system design at the outset. It is evident in transportation to get the right thing to the right

place at the right time, whether the place be Viet Nam, Sacramento, White Sands, or along the crescent from Louisiana to Florida. It is evident in the handling and storage of propellants. And it is evident in the generation of adequate technical manuals and documentation.

However, NASA does not stockpile large end item inventories and our logistics support, except for tracking and recovery operations, is confined to the continental U.S. We do not have to compensate for the use of newly trained field personnel, and we do not have to overcome losses in transportation or losses to enemy action. Our spare parts requirements are concentrated at test and launch sites which are sophisticated industrial complexes, and our launch operations are carried out by technicians with years of experience. NASA end items are characterized by high cost, low density, and until now, short life span.

Nonetheless, we in NASA have learned that any of our program logistics elements can become critical to cost, schedule or performance in the absence of effective logistics management, a conviction shared by our friends in the military and industry. The viewpoint of the Office of Manned Space Flight is that without logistics excellence, our efforts can fail just as surely as if we had neglected cost control, reliability, quality assurance, or scheduling.

To translate this conviction into action takes high level management effort. For this reason, I am particularly pleased to see so many members of our contractor officers joining with NASA management for this first annual Logistics Management Symposium.

Through the medium of this symposium, and its focusing upon logistics management, the Manned Space Flight Directors and I believe that the tenets of good program management and good logistics engineering may be more effectively applied to NASA programs. It is truly important that top management members of NASA and industry identify clearly the requirements of program logistics, and meet these requirements with timely, positive cost-effective action.

I am pleased as well to see the formation here of a new Society of Logistics Engineers. Through the formal framework of this new society will spring greater professional interest in our common logistics problems, and greater assurance of their solution. My congratulations to the charter members of this new professional organization who have pledged themselves to the cause of advancing logistics management and technology.

Turning to our NASA programs, I should like to comment briefly on some of the logistics considerations that we

in Manned Space Flight are facing today as our Gemini program moves toward the final flight and we move into the operations phase of the Apollo program. Before I proceed, however, it is appropriate at this time to commend all of the people -- many of them are here today -- who have contributed to the achievements of Gemini.

There wasn't an area of logistics that at some time didn't present a challenge for NASA and the Gemini contractors, the Air Force and the DOD recovery team. However, all members of the team applied their logistics skill in achieving Gemini's proud record of success.

An example of contractor management's attention to logistics is provided by the Martin Company's Gemini Assets Task Team. This team was set up at Martin Baltimore to assure that adequate program assets, both production and spare units, are available when needed for successful launch of the final Gemini launch vehicles.

Martin's Assets Task Team includes personnel from the functional program elements -- Logistics, Engineering, Quality, Procurement, and Planning -- as well as from the Martin Canaveral Division. Since its formation prior to the Gemini IX mission, this team has developed the responsiveness necessary to assure timely completion of the Gemini Launch Vehicle program.

In the supply support area, the team is working to provide acceptable replacement units quickly for failed parts. The team also is maintaining a continuous survey of program assets with the objective of preventing launch vehicle failures. This is the kind of management attention I want to see for each of our launches in the future to insure against delayed launches with their attendant cost.

These and many other valuable lessons of Gemini are being put to good use in the Apollo program.

However, the need for increasing the emphasis on logistics management for Apollo is great. Because of its size and scope, the Apollo program poses logistics problems well beyond the demands of Gemini. The experience and technology resulting from Gemini have contributed substantially to Apollo in all aspects, including logistics -- but Apollo's combined requirements are an order of magnitude greater in terms of hardware, facilities, ground support equipment, personnel, and logistics.

The Apollo Saturn space vehicle involves 20,000 contractors and subcontractors and has more than 900,000 individual parts. The Saturn V first stage holds 56 tank cars of propellants. The second and third stages of Saturn V transported by water during the Apollo program will spend a total of 700 days at sea. Apollo program

transportation by all modes will require coordination with nine Government agencies. The launch windows for the Apollo lunar mission are relatively small, malfunctions on the pad must be kept to a minimum while corrective maintenance must be extremely fast and reliable. All of these elements make the Apollo logistics program both complicated and costly.

Considering the obvious demands for control and integration of these large-scale, complex logistics support elements, it is only prudent to recognize that we are now entering our most critical period for logistics support of Apollo. The operational phase of the program will make the greatest demands upon the logistics elements required to sustain the flight hardware preparatory to launch.

The stringent requirements for controlling and reducing program costs impose further demands upon Apollo logistics management. The Apollo contractors are well informed as to our critical requirements to control program costs parts. This can be accomplished only by controlling all parts of the program budget, including that allocated to logistics. The Manned Space Flight budget represents an operating cost of $10 million a day, and the cost continues regardless of whether we accomplish

anything. In this sense, a missed launch whether due to technical or logistics deficiencies costs millions for every day we are delayed.

In emphasizing logistics, therefore, I certainly am not suggesting a more costly logistics effort; on the contrary, I am suggesting that more management brainpower be applied to achieve cost effective logistics support for the operational phase of the Apollo program. It is reasonable to assume that the application of brainpower will result in fewer dollars spend in meeting unplanned logistics requirements, fewer dollars spent in solving unexpected logistics problems, and fewer dollars invested in support which exceeds program requirements.

I have encouraged all Manned Space Flight managers to be alert to innovations which will enhance our logistics posture or reduce logistics operating costs. For example, we have recently negotiated an agreement with the Air Force to provide propellant management for certain selected fuels and propellant, an agreement we expect to result in substantial savings for both of us. In addition, a study is now underway here at Marshall Space Flight Center to determine the size and preferred location of a central repair and supply facility for Launch Vehicle ground support equipment.

The area of spares management provides another illustration of the application of brainpower. At the present time, Apollo program managers are reevaluating the planned program support against available ground and flight test results. In this evaluation they will assure that the planned logistics support in extra components, spare parts and other support elements meets but does not exceed the requirements, as indicated by current program experience.

Such planning recognizes that logistics support requirements might change in the future with changes in the overall program or program operations environment.

For example, during Gemini launch preparations in September 1965, we had just completed arrangements to consolidate our liquid hydrogen supply source for the East coast with one contractor in New Orleans. Then Hurricane Betsy hit the Gulf Coast and our New Orleans source was cut off. Fortunately, a Florida plant that was to be phased out with the new supply plan was still operating. We quickly brought it back into full-scale operation. Otherwise, we would have had to bring the propellant all the way from the West Coast, which could have easily delayed the Gemini launch schedule. We have since provided contingency plans for all of our sources

of supply.

While planning for contingencies, we consider accelerated schedules as well as program delays, something we learned when a Saturn stage was delivered well in advance of plan. Our contingency planning now provides for the logistic lines to be open whether the stages are delivered on, behind, or ahead of schedule.

On the subject of contingency planning, it is worthwhile to consider the impact of the Viet Nam military operational requirements on Manned Space Flight program logistics. We are learning that it is unwise to assume yesterday's plans will always support tomorrow's operations. Our nation's support of Viet Nam is affecting lead times, materials, priorities, and schedules. Yet our collective planning has been responsive enough so that I know of no direct program impact resulting from the effects of Viet Nam.

With the quickening tempo of Apollo program operations and the peaking of logistics support, we must not overlook the application of another management technique that is not always found in the formal literature. This is the ingredient which I call teamwork -- teamwork within NASA and teamwork of NASA with its contractors and the Department of Defense.

The geographical scope of the Apollo program and the size of the Apollo government-industry organization make teamwork vital to success. This need for cooperative effort is particularly evident for logistics, which pervades the entire program effort. There must be a strong sense of teamwork within the entire program organization so that logistics considerations are made concurrent with other program decisions.

All of us know that consideration of logistics problems at the appropriate level has a way of being postponed to a day of reckoning farther down the road. We are inclined to defer those decisions for which one will not be called to account until later, even though the delay compounds the problems and often prevents any practical solution. It is management's responsibility to determine the impact upon logistics of other program elements, and in turn, the impact of logistics on everything else, before the fact.

We must plan in as much detail as our knowledge permits. We must determine where we are going, how and when, and having done this, we must allocate our resources and specify all of our technical requirements. We must determine our logistics support concept and our plans to execute it.

In this regard, we meed to improve our definition of what we want the contractor to do, by improving the scope of work we give him. We need to define the effort expected considerably earlier in the program. And we must follow through with better contract management so the program manager will know at all times just where he stands with relation to achieving his goal in logistics.

The Office of Manned Space Flight recognizes that logistics must be integrated thoroughly into the program from the preconceptual phase, and must be effectively managed throughout operations to ultimate disposition of the hardware.

Logistics planning is just as vital to the space effort as it is to military operations. We must plan our support activities in detail, taking every advantage of our ever-expanding capabilities in accurate requirements computation, reliable communications and fast, responsive transportation. These are important considerations both operationally (unneeded stocks are a millstone around our necks) and from the point of view of program costs.

Indeed, the early consideration of program logistics has become increasingly important from the standpoint of cost effectiveness. We are required to look at our

total program costs, and will do so increasingly in the budgeting of future programs.

As we move into programs beyond Apollo we must reassess our logistics support concepts based on the needs of these new programs. These programs will be characterized by longer and longer flight durations and constrained by the reliability we can achieve in components, subsystems and systems and by the new concepts for maintainability we develop.

The need for reliability has been with us, of course, right from the start in Mercury in Gemini, and on into the Apollo program. As we go onto longer and longer duration missions, however, reliability -- extended reliability -- becomes more and more important. In the past we have stressed reliability. We have utilized redundant subsystems and this approach has been reasonably successful to date. We have had, and throughout Apollo, will have, extremely limited capability for maintenance in flight. As we go into the post-Apollo era with flight durations of a year or more, we will, of course, have larger crews, greater mobility for individuals and certainly some capability for inflight maintenance and repair. However, this capability will always be limited and reliability of components and subsystems

will be vital to mission success and indeed to crew safety.

The analytical trade-offs necessary for NASA to reach optimum cost effectiveness cannot be carried out without thorough consideration of balanced logistics support. Contractor studies for future programs beyond Apollo must therefore emphasize logistics as a prominent factor in life-cycle cost determination.

The speakers who will follow during this symposium will have much wisdom to impart on the specifics of meeting logistics support requirements. My purpose has been to stress NASA's need for continuous top level attention to provide timely and effective logistics management, particularly as we reach the operational phase of the Apollo program.

This symposium presents us with a rare opportunity. Assembled here are the people who have the ability and the authority to make whatever changes and improvements are needed to establish a strong chain of logistics support in all our organizations. Through your personal interest and attention, we will reach the excellence of logistics management and technology needed for successful achievement of national goals in space.

I wish you the greatest success in this symposium.